WHAT IS CLAIMED IS:

1. A single crystal spinel wafer, comprising:
a front face and a back face; and
an outer periphery having first and second flats.

2. The single crystal spinel wafer of claim 1, wherein the wafer has a <111> crystallographic orientation.

3. The single crystal spinel wafer of claim 1, wherein the front and back faces of the wafer extend along a {111} crystal plane.

4. The single crystal spinel wafer of claim 1, wherein the first flat indicates an orientation of a cleavage plane of the wafer.

5. The single crystal spinel wafer of claim 4, wherein a cleavage plane of the wafer intersects the front face at a locus of points extending along a line, the line being parallel to the first flat.

6. The single crystal spinel wafer of claim 5, wherein the first flat extends along a plane in the {2 2 –4} and {1 1 –2} plane families.

7. The single crystal spinel wafer of claim 5, wherein the second flat indicates a direction of cleavage propagation of the cleavage plane.

8. The single crystal spinel wafer of claim 5, wherein the second flat identifies the front and back surfaces of the wafer.

9. The single crystal spinel wafer of claim 5, wherein the cleavage plane makes angle of about 55 degrees with respect to the front face.

10. The single crystal spinel wafer of claim 1, wherein the second flat extends along a plane in the {02-2}, {01-1}, {22-4} and {11-2}plane families, which is non-parallel to the plane of the major flat.

11. The single crystal spinel wafer of claim 1, wherein

12. The single crystal spinel wafer of claim 1, wherein a normal to the first flat and a normal to the second flat lie in the same plane such that the normals intersect each other, and the normals make an angle of 60, 90, 120, or 150 degrees.

13. The single crystal spinel wafer of claim 1, wherein the wafer comprises non-stoichiometric spinel.

14. The single crystal spinel wafer of claim 13, wherein the wafer has a composition is represented by the general formula $aAD \cdot bE_2D_3$, wherein A is selected from the group consisting of Mg, Ca, Zn, Mn, Ba, Sr, Cd, Fe, and combinations thereof, E is selected from the group consisting Al, In, Cr, Sc, Lu, Fe, and combinations thereof, and D is selected from the group consisting O, S, Se, and combinations thereof, wherein a ratio b:a > 1:1 such that the spinel is rich in E_2D_3.

15. The single crystal spinel wafer of claim 14, wherein A is Mg, D is O, and E is Al, such that the single crystal spinel has the formula $aMgO \bullet bAl_2O_3$.

16. The single crystal spinel wafer of claim 14, wherein the ratio b:a is not less than about 1.2:1.

17. The single crystal spinel wafer of claim 14, wherein the ratio b:a is not less than about 1.5:1.

18. The single crystal spinel wafer of claim 14, wherein the ratio b:a is not less than about 2.0:1.

19. The single crystal spinel wafer of claim 14, wherein the ratio b:a is not less than about 2.5:1.

20. The single crystal spinel wafer of claim 14, wherein the ratio b:a is not greater than about 4:1.

21. The single crystal spinel wafer of claim 14, wherein the wafer has a lower mechanical stress and strain compared to stoichiometric spinel.

22. The single crystal spinel wafer of claim 1, further comprising an active layer, the active layer comprising a nitride semiconductor layer.

23. The single crystal spinel wafer of claim 22, wherein the nitride semiconductor layer comprises $Al_xGa_{1-x-y}In_yN$, where $0 \leq x \leq 0.25$ and $0 \leq y \leq 0.5$.

24. The single crystal spinel wafer of claim 22, wherein a cleavage plane of the wafer intersects the front face at a locus of points extending along a line, the line being parallel to the first flat and parallel to a cleavage plane of the active layer.

25. The single crystal spinel wafer of claim 1, wherein first flat is a major flat, and the second flat is a minor flat.

26. An active device provided on the wafer of claim 1.

27. The device of claim 26, wherein the device is an optoelectronic device selected from the group consisting of a laser or LED.

28. A single crystal wafer, comprising:

a front face and a back face;

a cleavage plane intersecting the front face at a locus of points extending along a first line; and

an outer periphery having first and second flats, wherein the first and second flats identify (i) an orientation of a cleavage plane of the wafer, defined by a relationship between the first line and the first flat, and (ii) a direction of cleavage propagation of the cleavage plane from the line.

29. The wafer of claim 28, wherein the first line and the cleavage plane have a predetermined angle with respect to each other.

30. The wafer of claim 28, wherein the first line and the cleavage plane are parallel to each other.

31. The wafer of claim 28, wherein the cleavage plane intersects the bottom face along a locus of points forming a second line, wherein the cleavage plane is oriented such that the cleavage plane slopes away from the first flat and that the second line is located a distance from the first flat that is greater than a distance between the first line and the first flat.

32. The wafer of claim 31, wherein the first flat is a major flat, the second flat is a minor flat.

33. The wafer of claim 31, wherein the second flat is positioned to indicate the direction of a slope of the cleavage plane.

34. The wafer of claim 28, wherein the wafer consists essentially of a single crystal having the spinel crystal structure.

35. A method of forming active devices, comprising:
providing a single crystal spinel wafer having a front face, a back face, and an outer periphery having first and second flats;
orienting the wafer based on the positions of the first and second flats;
forming at least one active layer to overlie the wafer; and
cleaving the wafer to form active devices.

36. A single crystal spinel boule, comprising:
an outer periphery having first and second flats.

37. A method of forming wafers, comprising:
forming a single crystal boule having a <111> orientation;
forming first and second flats in the boule; and
slicing the boule into wafers, wherein the first and second flats indicate an orientation of a cleavage plane of the wafers, and identify the front and back faces of the wafers.

38. The method of claim 37, wherein the location of the first and second flats is determined by electron imaging.

39. The method of claim 37, further comprising forming first and second opposite flat surfaces at first and second ends of the boule, the flat surfaces formed such that a central axis of the boule that extends perpendicularly to the first and second flat surfaces, is aligned to within 5 degrees of the a <1 1 1> direction.